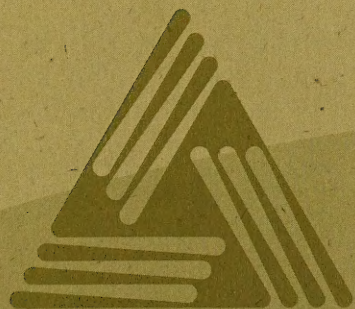


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ustainable Agriculture



*Cooperative
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Old Meets New In Modern Farming

A new generation of farmers are getting a first-hand lesson in the age-old saying "history repeats itself." With Extension's aid these self-proclaimed eco-farmers are combining centuries-old farming practices with high technology to modernize their agricultural operations. A new trend—driven by contemporary environmental concerns—is forever changing the rural landscape.

This new era of farming incorporates agriculturally sustainable techniques like cover cropping—a farming method used more than two thousand years ago to benefit the soil and other crops—with modern machines like track combines that dramatically reduce wear and tear on the soil. The combination of old and new technologies are providing practical and profitable alternative farming strategies, addressing consumer concern over agriculture's impact on the environment.

Jim Moseley, an advocate of Cooperative Extension sustainable agriculture programs, is the owner of west central Indiana's Moseley farms. Moseley says farmers are aware and concerned about how they can change their habits to put less stress on the environment. "There is a new awareness about the impact that our production practices might have on natural resources and a willingness to ask questions and accept scientifically documented solutions to solve any problems," he says. "The Alar issue, while devastating to a sector of the agricultural economy, really caught the attention of farmers as to what can happen when we ignore problems and let political forces override good decision making."

Moseley, who owns a 2,300 acre hog operation, says that while farming is a way of life for him and his family, it is also a business; and decisions on how to operate the farm are based on economics. Like many of today's young farmers, Moseley believes good economic decisions can be made without detrimental impacts to the environment.

"I was raised on a family farm with a strong sense of values," says Moseley. "Included in those values was a respect for the soil and water resources we had been given to manage," he continues.

"In addition to my parents, my grandfather spent the last years of his life demonstrating to me the high value he placed upon conservation. From watching him, it just became a natural part of my decision-making process."

Today's progressive farmers see the move toward a more economically and environmentally sustainable agriculture as inevitable. Farming is sustained by the very resources it must protect. According to Moseley, to adopt any other position would mean certain economic

disaster for many farmers. "A lot of people view this as a zero-sum game, ...improve environment, reduce economic return, or vice versa," he states. "In my view it's not that way at all; especially if we build our solutions on the premise that both are achievable simultaneously."

The decision to convert to more environmentally sound agricultural production techniques is an evolutionary process. Scientific and technological advancements will increase individual producers' ability to farm more efficiently. In addition, further development and use of information technology will mean the communications/learning tools farmers need to implement new farming strategies will be readily available and easily accessed.

"Since we started farming 22 years ago we have always used some form of residue management tillage," said Moseley. "In the early years, it was chisel plowing, then one-pass tillage, and plant. In 1982, we jumped into ridge tillage with both feet and have been generally pleased with this production technology," he continues. "The farm implement of most concern was the combine because of the tremendous weight load it exerts on soils. As a result of this concern this fall we invested in a track combine that dramatically reduces field compaction. This decision is the first step of starting into a totally new technological period that will expand the use of track machines, as well as begin the implementation of 'site-specific' application technologies."

Today's farmers are adopting new criteria for the success of their operations. No longer interested solely in production levels, many are now looking at a broader base of information to determine their farming skill. How well one manages finances and personnel, markets goods, and implements new techniques to improve overall operations, are examples of new factors farmers must now weigh in to their overall equation. The adoption of sustainable agricultural practices, in answer to environmental concerns, is just one strategy farmers are using to remain competitive in the world agricultural market.

"The one area I think we will see a dramatic increase in as we move toward the twenty first century will be issue management," says Moseley. "External forces, more than ever will dominate the success and failure of the industry. Either we become skilled at addressing these issues or we will fail to compete," he adds. "I also think we must prepare for a technological explosion the like of which we have yet to see. Computers, lasers, sensors, satellites, bioengineering, ...all will change the way in which we do business. I see (our advances in these areas) as the one remaining competitive edge we hold over the rest of the world."

Jim Moseley is former Assistant Secretary for Agriculture for Natural Resources and the Environment. He is currently Director of Agricultural Services and Regulation at Purdue University, a land-grant university. He continues to farm in Clarks Hills, Indiana with the help of his wife and business partners.



Joy and Work

Francis Thicke's dairy farm rests on the level plains of rural southwestern Iowa. "It's a little different from the hills I'm used to farming in Minnesota," says the former Extension Service national program leader for soil science. "We have about 25 to 35 Jersey cows," Thicke adds. "We also process our milk in a small plant here on the farm."

Thicke is among the growing number of farmers learning from and working with the tendencies and forces of the environment. He does this through observation, innovation, and sound dairy management practices.

Thicke received a B.A. in music and philosophy from Winona State University (Winona, Minnesota). After this, he returned to the Minnesota dairy farm where he and his brothers—"mostly for fun"—experimented with alternative farming methods.

Nine years later, Thicke returned to graduate school. He took an M.S. in Soil Science from the University of Minnesota, and a Ph.D. in Agronomy, with a Soil Fertility specialty, from the University of Illinois.

From 1988 to 1992, Thicke worked at Extension Service, U.S. Department of Agriculture, where he focused on water quality programs. In June of this year, Thicke and his wife, Susan, returned to dairy farming, when they took over ownership and operation of the small dairy.

"We pasteurize and bottle our milk and sell unhomogenized cream line milk through local retail outlets," he says.

The Thickets grow only forages for grazing and harvesting hay. As he explains, "by not raising grains, we eliminate investment in grain production equipment."

What makes Thicke's operation interesting is an alternative grazing system he calls "controlled rotational grazing." This is a method of managing forages for high production and quality by using animals—in this case dairy cows—to harvest the forages.

"We were fortunate that one of my brothers visited at the start, and helped me design our pasture system," Thicke says. "My brothers have been early innovators in controlled rotational grazing. They get visits from a lot of farmers as well as requests to speak and consult on the subject. Basically, we converted our pastures into a system of 20 paddocks,"

Thicke explains, "cattle are let into a paddock when the forage is at peak nutritional quality, and are kept in the paddock for one or two days to allow rapid recovery of the forage plant after harvest."

"The paddock must be given sufficient rest to enable the forage plants to regrow through their maximum production phase, but no longer, so that nutritional quality and palatability do not suffer," Thicke stresses.

According to Thicke, early in the year the paddock can be grazed roughly every 20 days. As the season progresses, the time between rotations increases.

He lists five benefits of controlled rotational grazing over conventional harvest, storage, and feeding methods: (1) reduced equipment investment; (2) reduced labor and energy costs; (3) manure deposited in the paddocks where the forages are produced and harvested; (4) the cows like this grazing method; and (5) the system is easily managed, which prevents harming the environment (eliminating manure concentrations, reducing the potential for water quality impacts).

Thicke sees no disadvantages to the method he uses. "My experience is that on small to moderate-sized farms, there are usually simple, easy, and effective solutions to potential environmental problems," he says.

Although this is his first year using controlled rotational grazing, Thicke is pleased with the results. "Of course, the abundant July rains helped a lot," he admits.

Thicke also admits that he enjoys what he does. "I really like the work, but it's also very good that the farm is working out as a profitable business."

"Being away from farming for 10 years has given me a new outlook on and appreciation of it. One of my highest priorities now is making our operation as efficient as possible."



It's Love That Makes Her World Go Round

"Everyone should do something for the world," says Chatum County, North Carolina resident Nancy Easterling.

The owner of the Boothe Hill Wildflowers, Seeds, and Plants, and the Boothe Hill Tea Company and Greenhouse, Easterling is one of a growing number of Carolina growers producing alternative crops for local markets, and who benefit from research and Extension programs.

"I think about my two children," Easterling says. "I want them to live in a healthy, safe environment—and growing food organically does that," she adds.

Easterling has a BA in Social Work, and completed her graduate program in horticulture therapy at the University of North Carolina at Chapel Hill.

For several years Easterling worked in homes for the disabled, while gardening and managing a greenhouse in her spare time.

Her children were responsible for changing this.

"I didn't know how to juggle working full-time and being a full-time mother, so I decided to do what was best," Easterling says of her decision to devote more time to her family.

This decision also afforded Easterling the time to get more involved in something else she loved—producing and marketing an array of organically grown crops and products.

Easterling traces her love for growing things (the natural way), to her mother and grandmother, who shared her interest in gardening.

A native of Charlotte, North Carolina, Easterling began growing and wholesaling organically grown native wildflowers, perennial herbs, fresh cut basil, and other alternative products approximately 4 years ago.

"At that point, I simply hoped the organic quality of my product would make a difference with customers," she explains.

She started talking to Keith Baldwin, the Chatum County Extension agent. "The Extension Service has helped a lot," she adds.

"In those days, it was much harder to know what to do from an IPM (Integrated Pest Management) perspective," Easterling says. Today, in Chatam County, Extension has a greater emphasis on IPM. This makes the information more readily available to growers like Easterling.

"I consult with my Extension agent at least once a week," reveals Easterling. "At times I feel guilty, taking up so much of Keith's time," she says with a chuckle.

These days the agricultural research and information Easterling receives from the North Carolina Cooperative Extension Service provides her family-operated farm operation with a greater opportunity to produce scientifically. She can also network more with other alternative growers in the state.

Easterling is a leader in the state's organic community of alternative growers.

"She really wants other people to succeed," Baldwin says of her leadership quality. "She cares about people, and it shows."

When not operating her own alternative farm business, promoting the family-owned businesses of others, or sharing information with like-minded growers, Easterling works with the local botanical garden, a further illustration of her commitment.

Another side of Easterling's sincerity draws from her experience with the disabled.

"I enjoy working with people with different abilities," Easterling says of her business' employment of handicapped workers. "They have a lot to offer, if given a chance."

Recently, Easterling completed the requirements needed to qualify as a certified organic grower. "I feel really good about the certification, Easterling says. "It provides me with a recognizable measure of credibility."



Two Men

"I don't know any responsible farmer who isn't concerned about stewardship and the land," begins Northumberland County, Pennsylvania farmer, Jim Landis.

Landis grows corn, soybeans, and an assortment of vegetables and grains on his 600-acre farm.

Low Input

Landis is one of an increasing number of farmers in western Pennsylvania, who, with the support of Extension, are making the transition from high synthetic input farming, to low, or no inputs at all.

"The perceived uncertainty of low, or no-input farming, makes it difficult for a lot of farmers to fully commit," says the 40-year old Pennsylvania native. "There is so much to learn about low input farming. With more information—which we're getting more of from Extension and other sources—some of this uncertainty is eroding," he adds.

Rising costs, environmental regulations, and farmers proving that well-managed low and no-input methods work, give farmers like Landis a reason for trying alternatives to conventional methods.

No Input

Twelve miles away from Landis, Preston Boop, a farmer in Union County, uses no chemicals in his farm operation.

"Preston can do that because he also owns a masonry business that supports his lifestyle," Landis explains.

"But what he's doing helps a lot of us who need more time to make the change," Landis adds. Both Landis and Boop feel low and no input methods are going to become more acceptable to farmers in the future.

"In 1936, my uncle farmed organically, and it made good common sense. It makes sense now," says Boop. His uncle's organic farming methods were the genesis of Boop's no-input approach.

"In 1987, when I started no-input farming, a lot of people laughed," Boop recalls. "Now they're coming over and asking questions."

According to Boop, his operation is doing as well, and at times better, than farmers using conventional methods. "Last year, during the drought, my corn yields were double the county average," Boop explains. He attributes this to the high levels of organic matter collecting in his soil since he began no-input farming.

Through careful management, various soil improvement methods (for instance: fall cover crops, composting), and staying away from synthetic herbicides, pesticides, and fertilizers, Boop is able to enrich the quality of his farm's soil.

He works with Penn State Cooperative Extension, keeping records of his soil tests, field measurements, and yield reports. "I share this information with other farmers, which gives them some idea as to how my operation works," Boop says.

This information sharing helps other farmers see for themselves that it's possible to change to a method of farming that's less expensive, environmentally friendly, and more acceptable to consumers.

"Preston and Jim are good examples of two men who are working to make sustainable agriculture work," said Union County Extension agent, Norman Conrad, who has worked with both men.

Conrad, Landis, and Boop agree that education is one of the most important tools for farmers, if they are going to be able to make the switch to low- and no-input farming.

"The more you know about low-input farming methods," states Landis, "the more confident you get, which increases your chances of changing, and success."



One Man's Solution

By nature a pragmatist, Steve White of Buncombe County, North Carolina, seems well suited for what he does. "It's hard work," he says. "Luckily I can call on my Extension agent when I need her advice."

Steve and farmers like him participate in Cooperative Extension programs that enable them to preserve and improve their way of life.

Steve White's farming career began in 1984. After 20 years as a landscaper and commercial photographer, he moved to western North Carolina, where the soils are alluvial, and the terrain rocky and mountainous.

Another Way of Life

It was true, Steve had no history, no practical experience in agriculture. What the 42-year-old certified organic grower had was a plan.

"Initially, after the move, I continued working as a landscaper," explains the native North Carolinian.

This enabled Steve to acquire the equipment he needed to get his "Grey Goose Farms" off the ground. He started producing vegetables. He developed a greenhouse nursery. He developed markets. He sold. He succeeded.

Five Years Later

It happened. Steve's yields were declining. "I used the same approach to farming as most farmers in the area," Steve says.

Relying heavily on chemical inputs was the acceptable and practical thing to do. Chemicals were effective, and using them meant less work for Steve.

Declining yields translated into less money, less income, less for Steve's family (his children's health care, their clothing), their way of life....

One day, a wholesaler who knew his operation made an interesting offer. "He told me he could sell my broccoli for 40 percent more," Steve says.

There Was A Catch

The broccoli had to be organically grown. "It didn't take me long to decide what to do," Steve said. Forty percent more income helped Steve decide. He talked to his county Extension agent. He participated in the Organic Production Certification and Registration Program. He became a leader in the state's alternative farming community.

Shifting to an organic operation meant working harder, a lot harder, but it also meant working smarter. With some advice from Extension, Steve made the changes. He began using fewer chemicals. It took time, sweat, a little money, and thinking, but it happened. The farm is today environmentally friendly. It's also more profitable by at least 20 percent.

"I have more problems with pests and disease than I did before, but I make up for it in the quality of my produce," Steve says of his operation.

Having joined the increasing numbers of environmentally sensitive growers, Steve is proud of the shift, not only for himself, but for his family, and his customers.

Like Steve, many of this new breed of "niche" growers are driven by the desire to take care of a family. These small-scale farmers, family farmers, organic growers (call them what you will), survive by producing safer, healthier, alternative crops, and marketing locally.

Most tend to be younger growers (between ages 35 and 49). They are well educated and view their operations with no less business sense than the huge agribusiness operators. They have to be good business people to make it.

Organic growers are also aware of something else. Consumer confidence soars when they know what they are buying is organically grown.

Today

Steve agrees with the statistics that show a decline in the family farm.

"Sure the family farm is in decline," he says. "Small businesses all over are disappearing," he adds.

"To survive, you have to take a scientific approach to the business of farming," Steve explains. "By working smarter, safer, and producing a product that people want, we're making good things happen here in North Carolina."

The Sustainable Philosophy

"If you care about people, your family, or anyone, eventually you're going to have to own up to the fact that you have a responsibility to act," Steve declares.

He admits declining yields and the economics of conventional farming motivated him to shift to organic growing. He is also aware of the benefit organic growers offer society.

"By producing a safer, healthier product, we make a decent living, while doing our part for the environment," Steve says proudly.

To say the least Steve speaks with authority. He knows his subject—and is proud of it. "The bottom line is taking care of your family, and doing it responsibly the sustainable way."



Forty-Six Years of Sustainability

Located in the rustic rolling hills in the heartland of central Pennsylvania, one of the oldest, largest, and most interesting family farms on the east coast thrives!

Walnut Acres, the Beginning

As a young man, Paul Keene was a missionary in India. He met Mohaadas K. Gandhi and asked him what he should do with his life. The spiritual leader told Keene to sell all of his personal belongings and live a simple and peaceful life.

This was not an easy thing to do, but Gandhi's advice did stir Keene. He returned to the United States and began to follow the "sustainable agriculture" teachings of the naturalist, Sir Robert Howard.

Keene worked on the Kinberton Farm School near Philadelphia. As a farm manager, Keene was active in the school's alternative farm practice seminars and workshops. These seminars and workshops taught farm practices that gave participants an alternative to synthetic pesticides and fertilizers. These are similar to practices available to participants in some Extension Sustainable Agriculture programs.

A short time later, Keene met the founder of Rodale Institute, J.R. Rodale. The publisher was impressed with Keene and offered him a job. Keene declined.

Instead, Paul and Betty Keene moved to the Penns Creek area of Pennsylvania. They'd decided to farm the natural way, working in harmony with nature, not against it. Forty-six years and two generations later, Walnut Acres continues operating the sustainable way.

Sustainability

For more than four decades Walnut Acres has operated without the use of chemical inputs. Through soil improvement, crop rotation, natural pest control, and sound management principles, this family farm has developed a reputation for growing, preparing, and marketing natural foods that consumers feel safe buying, but more importantly, eating.

The Walnut Acres product line with more than 500 items, is distributed mostly to their 40,000 mail-order customers. Across this 580-acre farm complex are grains (oats, rye, winter wheat, and others); vegetables (tomatoes, potatoes, carrots, sweet corn, beets, cabbage, peas, squash); and more.

Walnut Acres also offers its customers all natural beef and poultry, breads, and eggs according to the farm's assistant general manager, Paul Shaw.

"Our beef and poultry are fed organic grains and fresh spring water," Shaw says. "We allow our livestock to graze freely, and do not use hormones or growth stimulants," he explains.

The farm hosts special events such as food tastings, cooking classes, and farm tours (which include cannery and bakery operations). There is a Farm store, and once a year, an open house and county fair.

Walnut Acres employs about 100 people and plans to maintain its sustainable way of doing things. Shaw says one reason for this is that organic farming is the fastest growing sector in the nation's food industry. Another compelling reason for using sustainable methods is reduced costs.

"Also, there are the longer term environmental benefits Paul and Betty Keene espoused," says Shaw. "It made sense then, and it makes sense now."

Norman Conrad, Union County Extension agent who works with the farm, believes Walnut Acres is the oldest organically certified farm operation in Pennsylvania. It is also instrumental in promoting organic and sustainable practices and policies throughout the state, according to Conrad.

"There are times when Walnut Acres looks to outside sources to supplement their product service," Conrad says. "Because of the farm's no input policy, this means buying from producers who farm the same way."

Promotion of their methods provides a larger and more reliable pool of outside sources for the farm's product needs.

"Over the past several years, there's been a visible increase in the number of farmers doing things the sustainable way," Shaw explains.

The Walnut Acres philosophy and the fundamental basis of Sir Howard's work are joined in his words, "Each generation has a sacred duty to hold over, unimpaired, the heritage of a fertile soil." These words ensure that Walnut Acres will remain sustainable for generations to come.

Harvest For A Whole Earth

By Lyra Halprin

Organic Farmers Kathy and Martin Barnes Prove That You Can Turn a Profit While Protecting the Environment.

"Every Waking Moment"

That's the amount of time Kathy and Martin Barnes spend working on their 27-acre intensive organic farming operation in Capay, Yolo County, about 40 minutes northwest of Davis. They're quick to add, however, that they enjoy what they're doing and they're successful, even though Kathy thinks farming should provide a better income.

Martin Barnes says his family's company, Capay Fruits & Vegetables, is vertically integrated—meaning they handle the entire business from seeding to selling. Kathy works hard coordinating the planting, weeding, and harvesting, and Martin sells the crops at farmers markets, and at retail and wholesale markets. The couple's four sons, 17-year-old twins Che and Noah, 10-year-old Thaddeus, and 7-year-old Freeman, think working on the family plot is slave labor. That's why Martin believes farming sometimes skips a generation; his grandparents farmed, his parents don't, he's back at it, and his sons can't imagine a harder job.

Both 42, Martin and Kathy didn't just stumble into farming. Kathy, a Bay Area native, said she's always wanted to be a farmer. She studied plant science at UC Riverside, where she became interested in ecology from a scientific point of view and was introduced to the concept of biological control (controlling pests and weeds with natural predators and planting techniques).

Martin, originally from Riverside, also received his bachelor's degree at UC Riverside, where the two met. They both went on to receive master's degrees at UC Davis in 1975—the year after their twin sons were born. Her degree was in ecology; his in community development.

Kathy also worked half-time as a staff research associate in the vegetable crops department at UC Davis until 1984, while Martin became founder and manager of the extremely successful Davis Farmers Market.

The two lived in a "nice" double-wide trailer for 5 years in Davis and started farming on 22 acres they purchased in the Capay Valley. Eventually they built a house on the property and moved there in 1981. They lease an additional five acres. Martin and Kathy have been farming for a total of 14 years, growing varieties of specialty lettuce, ornamental sweet peas, yellow and red cherry tomatoes, potatoes, squash, broccoli, cauliflower, eggplant, fruit punch melons, baby Tokyo turnips, 10 peach varieties (on one acre), mandarin oranges, and two kinds of Asian pear-apples.

The Barnes family farms according to "sustainable agriculture" practices—a term not as familiar to most people as "organic" farming, and encompassing much more. Sustainable agriculture is defined as farming that provides for basic human food and fiber needs, but also enhances the environment, is profitable, socially just, and provides a high quality life for farmers, farm workers, and society as a whole.

"I was always interested in whole systems," Kathy says, referring to the concept that everything in living systems is interrelated and that it is important to consider the entire environment when trying to solve a particular problem, like pest control. "Killing pests with chemicals may also pollute groundwater and air and kill off beneficial insects, resulting in greater problems for a particular crop," she adds.

Martin's interest in sustainable agriculture accelerated while he was in graduate school.

"I was interested in 1960s-type social change," he said, remembering classes he took from Isao Fujimoto, a lecturer in UC Davis' applied behavioral sciences department. Fujimoto and his students put together a source book for alternative agriculture, focusing on options for the farming community.

"Taking care of the earth" for organic farmers means people don't understand why chemical fertilizers are not considered organic. Chemical fertilizers are made from the earth's limited petroleum supply and, because they are produced away from farms, they must be transported (requiring further consumption of petroleum fuel) to get them to growers, Kathy explains.

The Barneses compost agricultural waste on their farm and use it to enrich their soil. They also purchase compost from a nearby distributor.

In the fall they plant a mix of legumes (Austrian winter peas, purple vetch, and bell beans) to loosen the clay soil and add nitrogen to plots that will lie fallow in the winter. They routinely rotate crops so as not to deplete the soil of any one nutrient.

Their emphasis these days is on intensive farming, which Martin says is critical to their survival. Since the Alar scare in the winter of 1989, more and more large farms have gone organic, which has swelled the market for organic fruits and vegetables. While Kathy and Martin are pleased that large farmers are interested in organic production, the increased supply means they are making less money for the same products.

"In the winter of 1988, we received \$12 a box for organic red leaf lettuce," Martin says. "This year the price dropped to \$5 a box."

Martin and Kathy say changes in the organic market have led them to do their own marketing, which is very time-consuming. Marketing with one other local farmer, they make the trip to the Bay Area in their truck several times a week and hit the Davis, Woodland, Marin County, and Berkeley farmers markets. Martin usually sells at the Saturday Davis Farmers Market with Thaddeus and Freeman, while Kathy handles the Sunday Marin Farmers Market. Che drives to Berkeley four times a week during the summer season. Martin and Kathy split that market the rest of the year. (Che's twin, Noah, is studying in Germany this year in a Future Farmers of America program.) The farmers markets are daylong productions, involving picking, setting-up, and travel time.

When the Barneses talk about taking care of the earth, they also mean taking care of the six farm workers they employ most of the year. Kathy is disturbed that small farmers rarely earn enough money to pay farm workers well or provide health insurance. The need to equitably consider farm workers in the agricultural equation is part of Kathy's wish for change in the industry.

In addition to hoeing the fields, picking crops and transmitting fax orders to wholesalers, the Barneses participate in a number of farming organizations aimed at changing the priorities of the agricultural community.

In addition, Kathy is a member of the UC Sustainable Research and Education Program's (SAREP) Public Advisory Committee, which makes recommendations for sustainable agriculture research grants and advises on the direction of the programs. She is also the organic farming consultant for a farming systems comparison project at the UC Davis campus.

Kathy said one of the main reasons she agreed to be a farmer-cooperator on the UC Davis farming project—which is comparing organic, conventional, and more sustainable farming systems—was to communicate the needs of organic growers to the university.

"For years there has been a giant gap between the university and organic farmers," Kathy says. "I worked for the university for 10 years. I feel I can communicate with both sides."

Kathy and Martin take pride in helping educate farmers, consumers, and the agricultural research community about the realities of farming and about the importance of sustainable farming concepts and organic farming. Their hope is that the price Americans pay for food will someday reflect the real cost of producing it: the stewardship required to make sure that the land will remain fertile and productive, the health and welfare benefits necessary to maintain an active labor force and a strong rural community, and a profit margin that will provide the incentive for people like themselves to spend "every waking moment" producing food and fiber for the rest of us.



Texas Agricultural Extension Service

People Helping People

NEWS

Farmer Views Sustainable Agriculture as Simply a Matter of Dollars and Cents

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MULESHOE—When Jimmy Wedel, corn and cotton farmer in the West Camp community, talks about sustainable agriculture, he talks about limited tillage, efficient irrigation, chemigation, fertilizing with barnyard manure supplemented by anhydrous ammonia, crop rotation, integrated pest management, and windbreaks, all of which are part of his production program.

What it all boils down to is a matter of dollars and cents, says Jimmy, who holds degree in agricultural economics from Texas Tech University. "We look at an input and say, 'All right, we're fixing to spend a dollar an acre out here. Are we going to get back \$1.01?' If we're not going to get at least \$1.01, there's no point spending that dollar."

That philosophy on inputs—based on cold, hard necessity—hasn't changed over the years, "but how I spend that dollar may have," says the young farmer.

Wedel, 34, and his father, farm some 2,900 acres. Besides the major crops of corn and cotton, they grow sunflowers and occasionally some milo. "Sustainable agriculture, in my mind, is what we've been doing for the last six or seven years," said Wedel.

Inputs are analyzed not only for effect on profit, but on the land that makes farming possible.

Working with Bailey County agent Curtis Preston and former agent Spencer Tankley of the Texas Agricultural Extension Service, Wedel has had several field plot demonstrations in which he and neighboring farmers could assess the economic and ecological effects of various practices.

Educational programs conducted by the Texas Agricultural Extension Service people of all ages regardless of socioeconomic level, race, color, sex, religion, handicap, or national origin.

The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating

As an alumnus of the Texas Agricultural Lifetime Leadership (TALL) program of the Extension Service, Wedel says he's had a unique and valuable opportunity to share and discuss his ideas with other young producers and agribusiness leaders of the state, and in Argentina. TALL is a 2 year program that takes carefully selected young agriculturists across the state to Washington, DC, and to foreign countries, to learn more about food and fiber production. "I'm at a loss for words to describe how TALL has broadened my horizons," Wedel says.

One thing the Wedels have done is to reduce the number of trips across a field with equipment. "It costs us an average of \$5 every time we go across a field with a tractor," he explains. "On corn, from one harvest to another, we get by on about five trips."

This includes the preparations, the planter, the fertilizer trucks, and the combine. Many farmers still make 10 or 12 trips across their fields during a season, Wedel says.

"We always rotate our crops whenever possible. We plant corn behind cotton, and cotton behind corn. The corn is pretty much no-till."

The last 5 years, on some of their farms, the Wedels have left the cotton stalks in the field after harvest. In the winter the stalks help hold snow in place until the moisture is absorbed.

"In the spring, when we get ready to plant, we just plant (corn) right down beside the cotton stalk," Wedel says. As they plant, they also put down about a pound per acre of atrazine, a herbicide, to keep the weeds down. "You have to have a good weed control program if you're going to go on low maintenance, or minimum tillage."

In 1988, noted Tanksley, Wedel shredded some cotton stalks and left others tall so they could determine if the stalks gave any protection to emerging corn.

"We definitely saw a difference in the vigor of the plant and the ability to grow faster and make quicker height than where there was no stalk and no wind protection," Tanksley says. "It was unbelievable that those cotton stalks were providing that much protection from the wind."

Preston said several Bailey County farmers are trying innovative conservation measures. One already has permanent grass planted on top of his terraces. The agent and neighbors are checking each time there's a big blow to see the amount of sand that moves.

And Preston said that where adequate water and pivot irrigation are available, several farmers are planting wheat, getting it to a stand, then killing it and planting cotton in the stubble. The idea is to help reduce soil erosion from the wind and to protect the young cotton plants.

But Wedel, one of the first to try that, says it just isn't economically feasible for him at this time.

"It was too expensive," Wedel says. "I was having to spend my limited water for two crops in one season, and harvesting only one. And we haven't had the chemicals needed to keep the weeds down."

"Two or three years from now, when we have chemicals that will go over the top of a crop (without damaging the crop) and give weed control, it may work. I liked the way that cotton looked when it came up in the wheat stubble." But he said the cost of the chemicals and the availability of irrigation water will be critical considerations for farmers.

Another demonstration the Extension agents and Wedel tried was designed to check optimum spacing of wheat rows as wind strips to reduce soil movement in high winds.

"We're doing strip crops," Wedel explains. "I have roughly nine rows of wheat, and then I'll have 18 rows of cotton. We'll rotate that every year. That way, every third year I'll be back to wheat."

The Wedels also use furrow diking—small dikes of earth every few feet down a furrow to hold irrigation or rainfall in place. This is used most in their dryland acreage. They use a combination of—sprinkler, row water, and surge irrigation. Jimmy likes the efficiency of sprinklers and surge.

One of the things a producer can do with sprinklers is chemigate, or apply herbicides or pesticides through the system, he says. "Not all chemicals are labeled (for chemigation)," Wedel states. "But most of the insecticide we use on corn and cotton we can run through the sprinkler."

To help do this, and reduce costs, Jimmy has mounted his chemigation tank and the injection unit that feeds the mixed chemical into the sprinkler, on a trailer. It is easily moved from one sprinkler to another, as needed.

"On cotton, we've been able to get by with about one-third what it would cost to spray the crops with an airplane. On corn, we've been able to cut back the rate of chemical to just about half, and feel we also get a bit better control because it goes more precisely where it's needed."

Five years ago, the Wedels and other Bailey County producers entered an integrated pest management program with the Texas Pest Management Association. "We hire a scout to come out and look at our crop and tell us when we need to spray chemicals, or determine when we don't have the bugs to warrant it," Wedel says.

"On corn, you can cut your tillage just about all you want to. But you've got to have plenty of water and plenty of fertilizer. If you cut those, you cut yields in a hurry," he adds.

"We're using 10 tons of barnyard manure on our corn each year," Wedel says. "That cuts down the commercial fertilizer use. Then we come back with about 200 pounds of anhydrous ammonia. That's our total fertilizer program for corn."



Sustainable Agriculture

Cooperative Extension System

Changing Perceptions, Attitudes, and Practices: U.S. Farmers and Environmental Issues

A national Gallup poll reveals that U.S. farmers see water quality as the most serious environmental problem associated with agriculture and they believe "safer" and fewer pesticides are part of the solution. According to the 1993 Sandoz National Agriculture Poll, conducted by the Gallup Organization and released in January of this year, today's farmers are more concerned about farm environmental issues than they were five years ago. These farmers share public interest in environmental issues and the majority have already adapted alternative farming practices, partly in reaction to public opinion about the environment. Most of these practices involve pesticide use and conservation tillage.

An overwhelming number of farmers believe education is the key to reducing public concerns about farm-related environmental issues. Most feel they share responsibility for this education along with government, teachers, manufacturers, and others. More than one-third of U.S. farmers say they have personally participated in efforts to educate the non-farm public.

The Sandoz National Agriculture Poll included a cross-section of grain, cotton, and vegetable growers from across the nation. The poll explored farmer opinions in five areas: perceived environmental problems, public image of farmers, placement of responsibility, pesticide regulation, and changes in farming practices.

Highlights from the poll's findings include:

- 92 percent of U.S. farmers are very, or somewhat likely to use safer pesticides in the future;
- 71 percent are very, or somewhat likely to use fewer pesticides;
- 66 percent of farmers favor tougher enforcement of penalties for misapplication of pesticides;
- 41 percent favor mandatory education and certification for farmers who use pesticides;
- 29 percent recommend limiting pesticide application to licensed personnel;
- 80 percent of farmers expect government involvement in farm environmental issues to increase (most are not happy with this prospect);
- 39 percent think farmers themselves should have primary responsibility for correcting environmental problems associated with agriculture (this is three times the percentage of farmers placing the responsibility with government and almost five times the percentage placing responsibility with agrichemical manufacturers);

- While most farmers think they are viewed as responsible stewards by their urban neighbors, 43 percent say their image has slipped;
- 80 percent of farmers believe the level of concern about environmental issues has increased among the general public over the past five years;
- Water quality is mentioned more than twice as often as other environmental agriculture problems by today's farmers, and nearly one-third of farmers rank this issue as their number one concern;
- Although 11 percent of farmers think contamination of food by pesticides is a serious concern, 38 percent believe the general public would rate this issue as their top farm-related concern.

Among farm practice changes:

- 20 percent of farmers say they are practicing conservation tillage as a result of public opinion;
- 22 percent of farmers are using reduced amounts of pesticides;
- 9 percent are using more environmentally friendly pesticides;
- 9 percent are monitoring pesticide use more closely than before;
- 8 percent of farmers are recycling pesticide containers;
- 6 percent are being more careful with pesticides;
- 5 percent are wearing more protective clothing.

The 1993 Sandoz National Agricultural/Gallup Poll has a margin of error of plus or minus 2.8 percent. For more information on the poll and/or its findings contact: Susan Croce Kelly, Sandoz Agro, Inc., 708/390-3638.

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Sustainable Agriculture

Cooperative Extension System

Cooperative Extension and Sustainable Agriculture

Sustainable agriculture embraces several approaches—low input, organic, diversified, alternative, regenerative—as well as solutions to problems such as water quality, food safety, environmental concerns, farmworker safety, economic competitiveness, and other issues. The Cooperative Extension System (CES), as a national educational network, is addressing the National Sustainable Agriculture Initiative through research, science, and technology. In accordance with its mission, CES has taken a proactive approach to providing the education and training necessary in assuring that every American is able to enjoy the benefits of a clean environment, a strong globally competitive agricultural economy, safe drinking water, reasonable food prices, and food safety—through the sustainability of American agricultural practices. Here are a few examples of CES sustainability programs, nationwide.

Southern Region:

The sustainable agriculture effort at the University of Tennessee, Agricultural Extension Service is in its first year. In this year, 121 county personnel received training in sustainable agriculture concepts. Training was conducted by Extension specialists within the University of Tennessee Extension Service. Key components of staff training focused on improved utilization of farm resources, farm family financial management, and implementation of best management practices for reduction of soil loss. Other training areas included conservation compliance, IPM, soil testing and crop nutrient management, improved storage and use of fertilizers and pesticides, sound crop rotation strategies, and crop and livestock waste management.

Several methods of delivery are used for educational programs. These include result demonstrations, farm tours or field days, winter meetings or farm schools, newspaper and newsletter articles, and radio and television interviews. Statewide, more than 400 educational events relative to sustainable agriculture reached approximately 14,659 persons. Three hundred and thirty-nine demonstrations were conducted that included at least one concept of sustainable agriculture. The Tennessee effort not only reached farmers and agribusiness persons, but also consumers and the general public.

Northeastern Region:

The University of Maine Cooperative Extension's (UMCE) Sustainable Agriculture effort includes programs for producers of fruits, vegetables, dairy, livestock and crops, as well as agricultural and municipal wastes.

Programming for fruit and vegetable producers began with an introduction to the concepts of sustainable production at the Maine Small Fruit and Vegetable Growers Association Annual Meeting at the Agricultural Trade Show in January. This was followed by five- and six-week short courses in southern and central Maine, respectively. Topics covered included principles of sustainable agriculture, cover crops and green manures, soil testing, small fruit production, tree fruit in a sustainable system and sustainable vegetable production. Approximately 70 producers attended the two short courses. Practices implemented included record keeping systems, soil testing, IPM, nitrate soil testing and the use of green manures. Two producer meetings in Franklin County introduced the concept of sustainable agriculture. Future programming will focus on implementation of specific practices.

Municipal and agricultural waste was addressed through an integrated program on composting that originated in Kennebec County. The composting video developed, was distributed to all appropriate state agencies, Extension offices and interested parties. A seminar on large-scale composting, drew representatives of 10 communities. To date, three communities, Brunswick, Houlton and Union, have implemented the technology. Programs were also conducted for nutrient management of manure applications in Piscataquis and Waldo counties.

Dairy and livestock producers learned through conferences and workshops about forage management and the correct use of nutrients for pasture and hay fields. A newsletter article on pasture management and pasture water systems went to 280 subscribers, and was reprinted in the popular press. Approximately 150 participants in an ITV course learned aspects of sustainable agriculture, including management philosophy and specific practices, such as proper nutrition and the use of colostrum to reduce dependence on antibiotics. Sixty-two beef producers enrolled in an integrated resource management program which includes a complete financial and production record keeping system.

North Central Region:

Among the success stories reported by the University of Minnesota Cooperative Extension Service are:

- The sustainable agriculture team participated in a public policy staff and development conference on May 4-6, 1992. About 25 county and state faculty from different program areas participated in the training on public policy education and its application to sustainable agriculture. Participants identified sustainable agriculture public policy issues, stakeholder groups, and educational strategies.
- **Economically and Environmentally Sound Management of Livestock Wastes.** This is a two-year demonstration program targets livestock producers in an 11-county area of southeast Minnesota. State, area, and county faculty educate farmers on the amount of plant food in manure and assist them in developing crop nutrient management plans. County agents identified cooperators in their counties that were willing to sample their livestock waste over a two-year period. The data base developed from this monitoring has helped to demonstrate the importance of determining the nutrient levels in manure which has led to improved manure management.

- **On-Farm Evaluation of Sustainable Agricultural Practices** is a project sponsored by the Southwest Farm Business Management Association (SFBMA) and funded by the Agriculture Utilization Research Institute (AURI) and SFBMA. The project consists of evaluating various sustainable agricultural practices on the basis of input costs, output, economic returns including labor requirements, and energy use.
- The practices evaluated include (1) reducing herbicide usage with banding, increased mechanical weed control, and the use of post emergence products, (2) using conservation tillage methods including fall chiseling, ridge tilling, slot tilling and no-till compared to conventional tillage for the area, (3) managing manure as a resource to replace commercial fertilizer and (4) following soil test recommendations comparing banding and broadcasting fertilizer.
- **Environmental Agriculture Education Program.** Rice, Steele, Freeborn and Mower Counties have conducted an Environmental Agriculture Education Program for the past three years. This program has two components—Field Demonstrations and Youth Education.

Western Region:

For organizational management purposes sustainable agriculture is divided into three main components at Washington State University. These components are Plant and Animal Management Systems, Management of Natural Resource Management Systems, and Plant and Animal Protection. Within the plant and animal management systems are interdisciplinary teams for Dairy Herd Management; Dryland Agricultural Strategies; Irrigated Crops; Tree Fruit and Grape Production, Management and Marketing; Small Fruit; and Livestock Production Management and Marketing. Forestland Management; Rangeland Management; and Seafood Production, Harvesting and Processing; and Marketing are the interdisciplinary teams within the Natural Resources Management System. Integrated Pest Management, Pesticide Education Programs, and Support Programs for Extension Pesticide Recommendations are the major activities under the plant and animal protection activities. The educational activities under Plant and Animal Protection are basically reported under the targeted programs Pesticide Applicator Training, Integrated Pest Management, and Pesticide Impact Assessment. Marketing and Farm Business Management are contained within each of these commodity systems.

Livestock Production, Management and Marketing

The Strategic Ranch Management (SRM) program conducted by the Extension livestock team is an interdisciplinary team approach to training producers how to establish and operate a sustainable beef production system. This was the second year of intensive week long training workshops. The program stresses goal planning, integration of production records and financial analysis, enterprise and whole-ranch budgeting, range and improved pasture management, herd health management, and the Holistic Resource Management (HRM) model. The interdisciplinary teaching team demonstrates basic principles and techniques using a case-study ranch.

Dryland Agricultural Strategies

The Dryland Agricultural Strategies team identified eight program areas that ensure sustainable dryland cropping. They include:

- Developing an On-Farm Testing Grower Network;
- Conservation Farming Systems Technology;
- Minor Crops; Farm Business Management;
- Soil Fertility Management; and
- Community Management Education.

Because of the various microclimates in eastern Washington, six production areas have been established. Within these production areas are soil type variations and topographic changes that require on-farm testing to validate best varieties, appropriate conservation tillage, appropriate crops for sustainable diversity, and fertilizer needs and rates. In 1991/92 the team conducted research on 12 on-farm testing sites to determine results from different conservation tillage systems, conservation planting systems, and nitrogen management in both fall and spring planted grains.

Impacts include:

- Seventeen articles on conservation farming in five farm publications in the region with an agricultural circulation of more than 50,000.
- Four PNW Conservation Tillage Handbook Series publications.
- 10th Inland Northwest Conservation Farming Conference on the theme "Precision Farming Variable Cropland."
- Profitable Conservation Cropping Systems" video based on the results of a six-year ARS study comparing the economics of different tillage systems, crop rotations and levels of weed control.

Farm Financial Management

- Two Extension economists completed six financial management computer programs funded with an ES-USDA grant. The six programs complete with documentation, videotape, and exercises were released to a nationwide audience in July 1992. The programs are designed to help producers analyze decisions regarding the acquisition and management of capital assets.

These are four examples of how CES efforts in sustainable agriculture work to assure that farmers, ranchers, agribusiness persons, policymakers, and the general public benefit from the systemwide education and training resources available to them.

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Sustainable Agriculture

Cooperative Extension System

Sustainable Agriculture Research and Education Program

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CATALOGING PREP

The Sustainable Agriculture Research and Education (SARE) program of the Food, Agriculture, Conservation and Trade Act of 1990 provides practical agricultural research and education to American farmers and ranchers developing environmentally friendly, globally competitive, and socially acceptable agricultural systems. SARE is also committed to strengthening family farms and the rural communities where they are located.

Today, more than 30 states have sustainable agriculture centers, or programs at land grant colleges and universities and other facilities. Here are a few examples of SARE success stories:

Reducing Chemicals On Produce:

A study at Prairie View A&M University in Texas, has revealed that farmers may be able to eliminate insecticides for earworm if they plant sweet-corn varieties that are naturally resistant to the pest.

Contact: Research Center, Prairie View A&M University, Prairie View, TX 77446.

Researchers at Rutgers University in New Jersey are recommending that eggplant growers (there) spray once instead of the normal 15 to 20 times. The benefit to growers is a savings of \$100 per acre, and a higher price for a better-looking product.

Contact: Rutgers University, New Brunswick, NJ 08903.

SARE research focuses on ways to control insects and plant diseases with few chemicals. Efforts such as biological pest control, crop rotation and developing pest-resistant crops improve consumer confidence in our nation's food supply.

Contact: George Bird, SARE Director, CSRS-USDA, 342 Aerospace Bldg., Washington DC 20250-2200.

Soil Fertility:

On-farm research in Virginia reveal that rye and hairy vetch cover crops can substantially reduce nitrogen fertilizer needs and provide increased weed control in corn silage production systems.

Contact: John M. Luna or Nicolas D. Stone, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Reducing Water Pollution:

Legume cover crops offer many water-saving and soil-building benefits in the crop rotations developed by scientists in Montana and Wyoming. If used widely in the Northern Great Plains and Intermountain region, these rotations would capture 3 to 4 million acre-feet of precipitation, greatly reducing soil erosion and groundwater contamination. They would also replace 120,000 tons of nitrogen fertilizer (worth \$24 million) a year, and reduce tractor fuel fills by 50 to 80 percent.

Contact: James R. Sims, Plant and Soil Science, Montana State University, Bozeman, MT 59717.

Sharing Information:

SARE provides resources for the Alternative Farming Systems Information Center at the National Agriculture Library in Maryland.

Contact: Jayne T. Maclean, National Agricultural Library, 10301 Baltimore Blvd., Beltsville, MD 20705-2351.

A noncentralized, multimedia Sustainable Agriculture Network is developing under auspices of the University of California-Davis.

Contact: Jill Auburn, Sustainable Agriculture Network, University of California, Davis, CA 95616.

PLANETOR, a farmer-oriented decision-support program originally developed at the University of Missouri, is being further developed by scientists at the University of Minnesota. Farmers and ranchers are testing the program to be certain it meets their needs.

Contact: John Ikerd, University of Missouri, Social Sciences, Columbia, MO 65211.

Controlling Weeds With Fewer Herbicides:

Chickens can control weeds in Michigan orchards as effectively as herbicides. Not only does the idea cut chemical costs, but also provides farmers with another marketable resource when the chickens are full-grown.

Contact: Stuart H. Gage, Entomology Department, Michigan State University, East Lansing, MI 48824.

Scientists in Alaska are testing geese as a way to control weeds and diversify income.

Contact: Tricia L. Wurtz, USDA Forest Service, Pacific Northwest Research Station, 308 Tanana Drive, Fairbanks, AK 99775-5500.

Among the many objectives of a California study is to evaluate mechanical methods and/or cover crops as substitutes for herbicides against annual weeds in vine rows.

Contact: Frank G. Zalom, Entomology Dept., University of California, Davis, CA 95616.

Highlighted in a Northeast regional project is a comparison of whole-farm low-input cranberry production to standard practices. Included will be an evaluation of spring reflow as a weed-control method.

Contact: Anne L. Averill, Entomology Department, Fernald Hall, University of Massachusetts, Amherst, MA 01003.

Strengthening the Link to Integrated Pest Management (IPM):

A close link is developing between the SARE program and the IPM initiative mandated in Section 1650 of the 1990 Farm Bill. Two new SARE projects include biological control for whitefly.

Safe, Cost-effective Weed Controls:

Safe, cost-effective weed controls are being tested in a wide range of climates and soils. Cover crops that smother weeds (some that even make their own 'natural' herbicides), rotations that disrupt weed cycles, and mechanical cultivation are a few examples.

Economic Benefits:

Economic benefits of low-input agricultural practices are being studied carefully. So are labor needs, financial risks, environmental effects and other vital issues.

On-Farm Research:

On-farm research is important to SARE projects because farmers help review project proposals and work with scientific research teams to ensure project results are put to work promptly and effectively.

SARE Programs Are Located Nationwide Within Four Regions:

Northeast region:

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.

Southern region:

Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, Virginia, and the Virgin Islands.

North Central region:

Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

Western region:

Alaska, Arizona, California, Hawaii, Idaho, Oregon, Montana, Nevada, New Mexico, Utah, Washington, Wyoming, and the Island Protectoraes.

USDA is responsible for the administration of SARE through the Cooperative State Research Service (CSRS) and the Extension Service (ES), in conjunction with the National Sustainable Agriculture Advisory Council (NSAAC), a minimum of four Regional Administrative Councils, the Agricultural Research Service (ARS) and other agencies.

Specific agricultural issues being addressed by SARE include:

- farm profitability;
- safe and abundant food and water;
- rural revitalization;
- soil erosion;
- farmer and farmworker health;
- international competitiveness.

SARE is funded through congressional appropriation.

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